

# Point Abino Drain Public Information Centre

March 21, 2022

Zoom meeting

Looking south at culvert  
south of Mathews Rd.

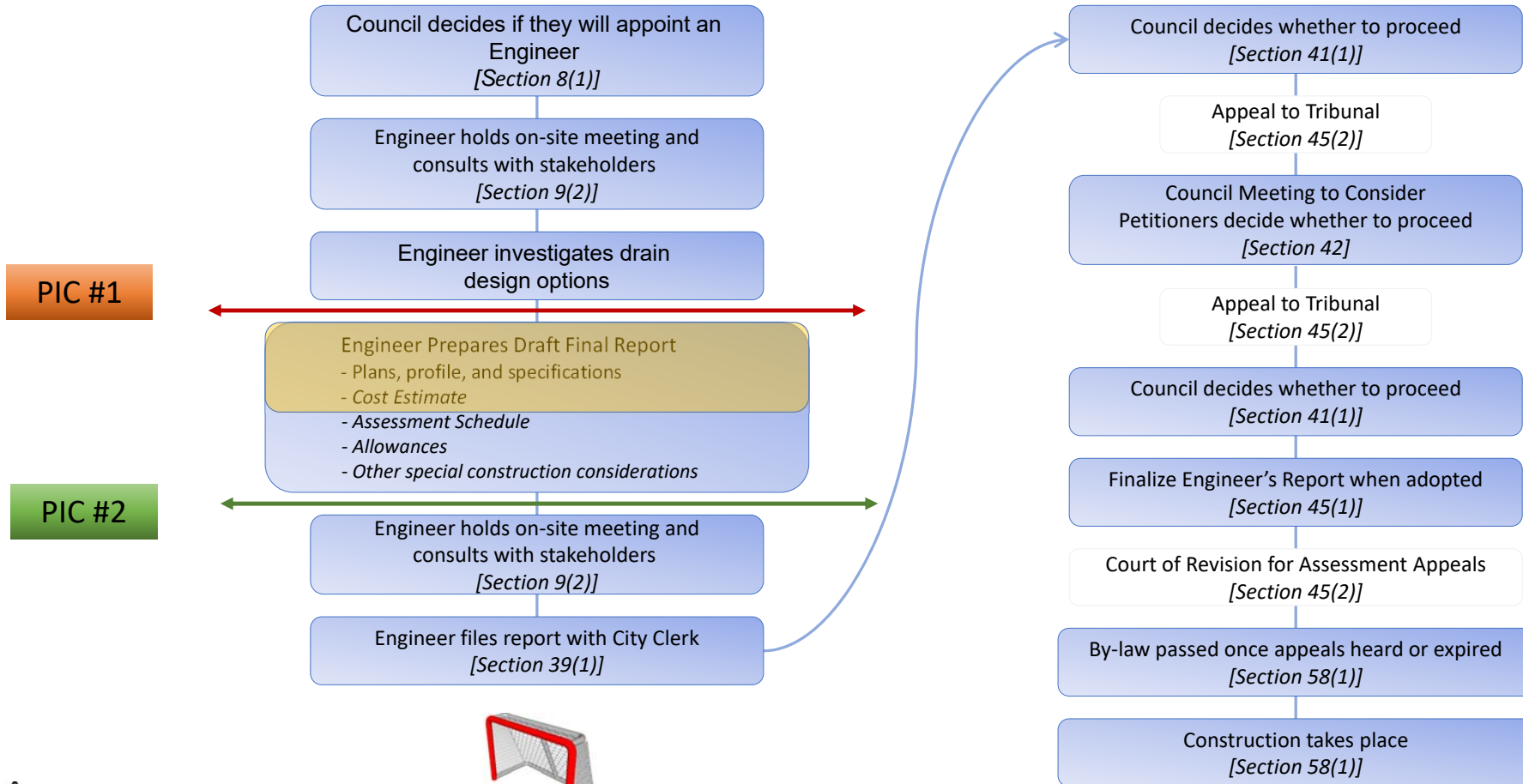
From:  
Dec. 11, 2020 @ 11:25am



# Agenda

- Role of Public Information Centre in the Drainage Act
- Drainage History
- Baseline Report
  - Public Input / Comments
- Watershed Modelling
- Drain Improvements
  - Public Input / Comments
- Next Steps
  - Agency Consultations
  - Design Progress submissions

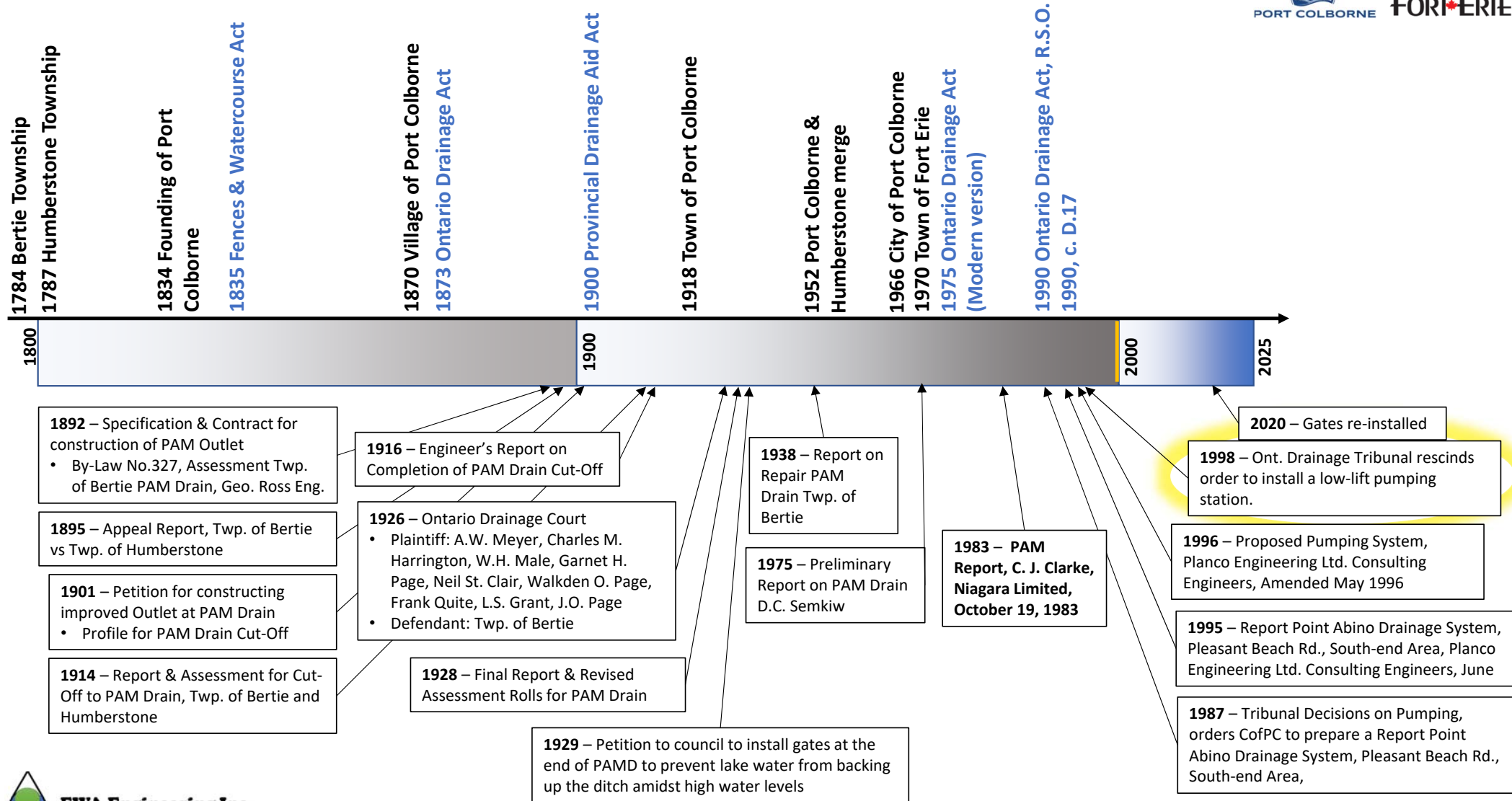
# The Ontario Drainage Act Process



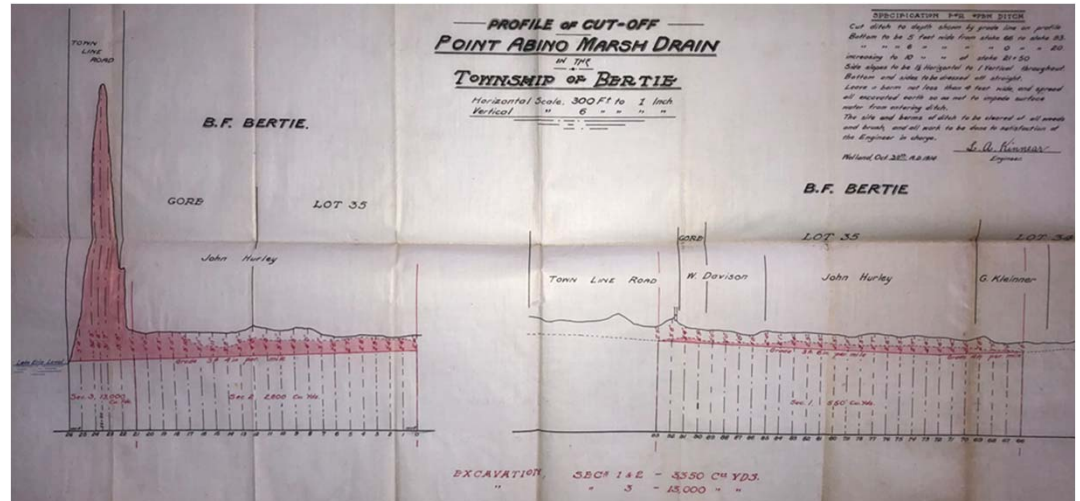
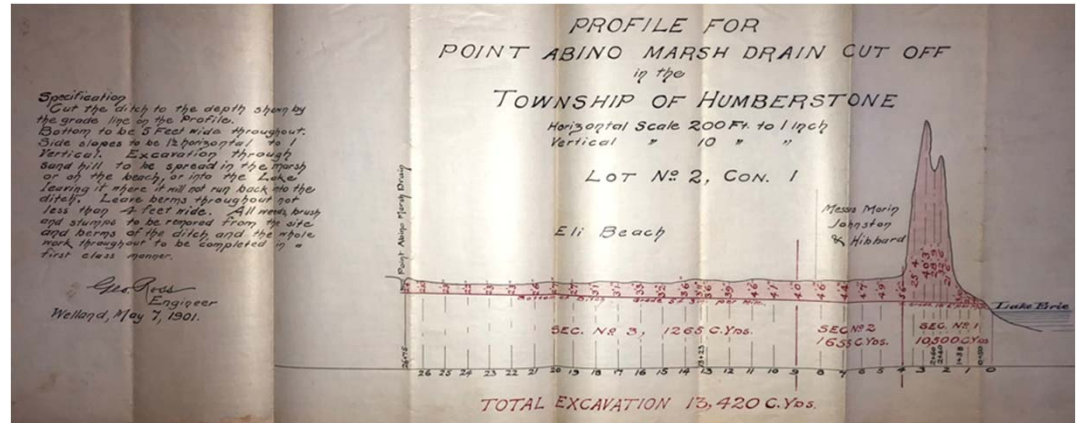
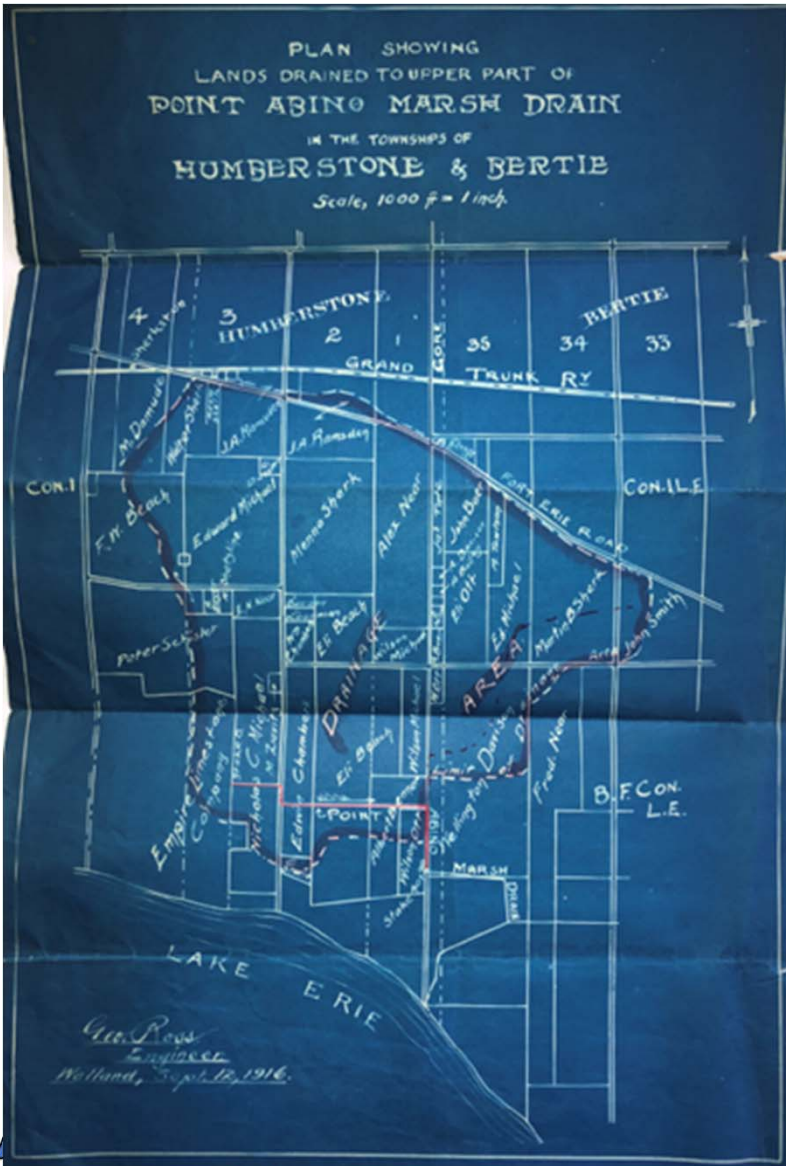


# Point Abino Marsh Drain History

1892 - 1998



# 1901 - 1915



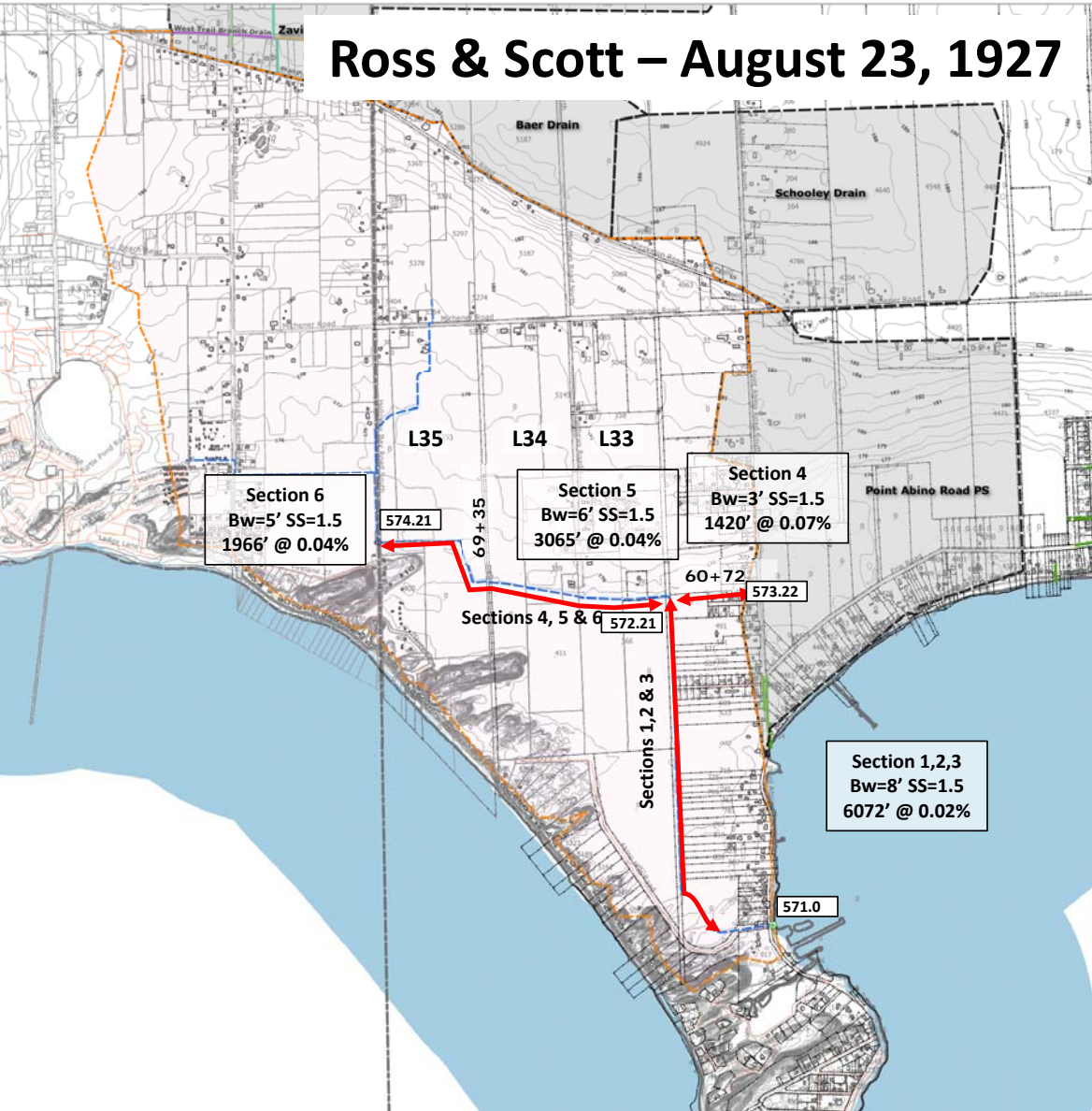


1925

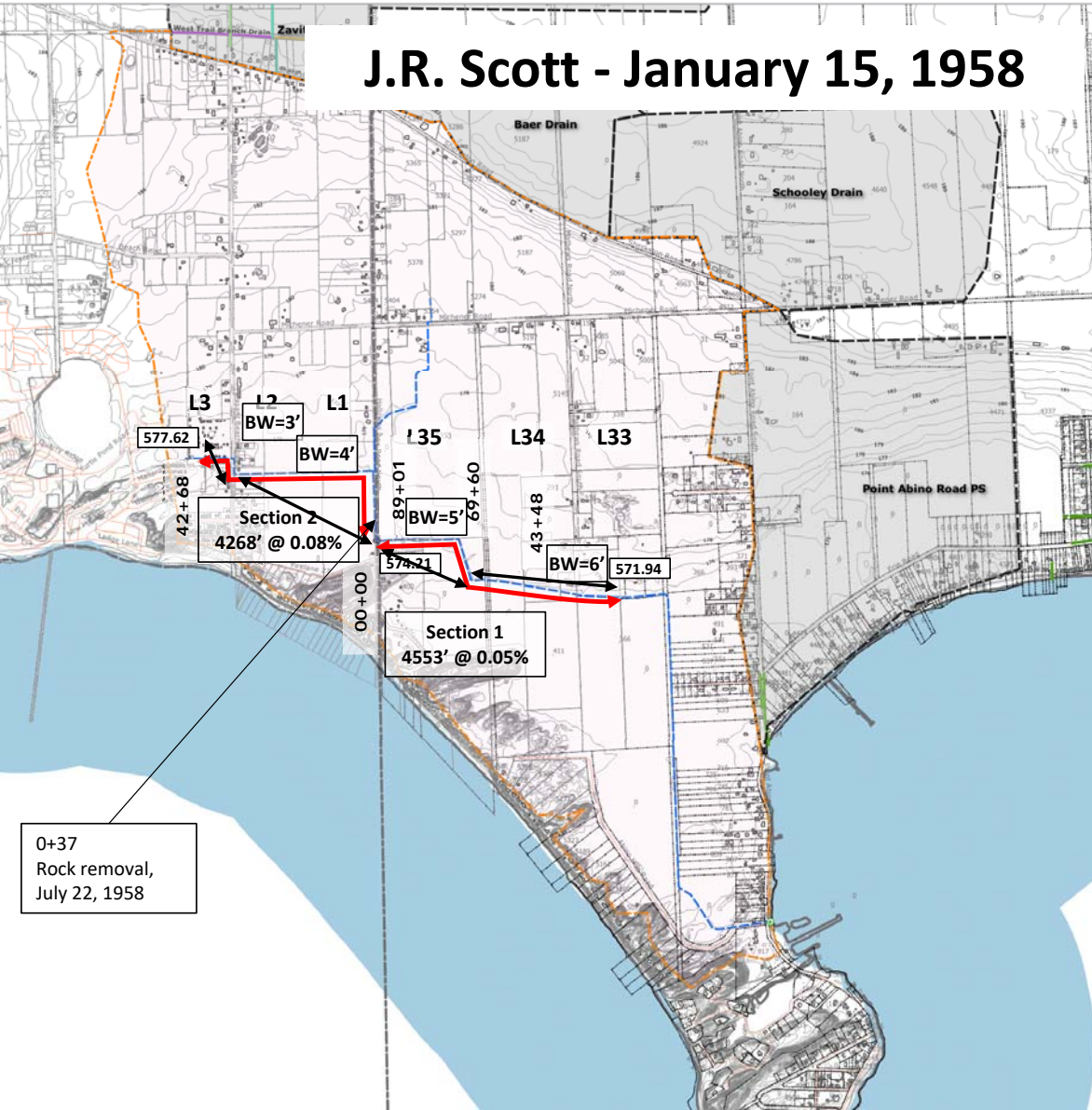




# Ross & Scott – August 23, 1927

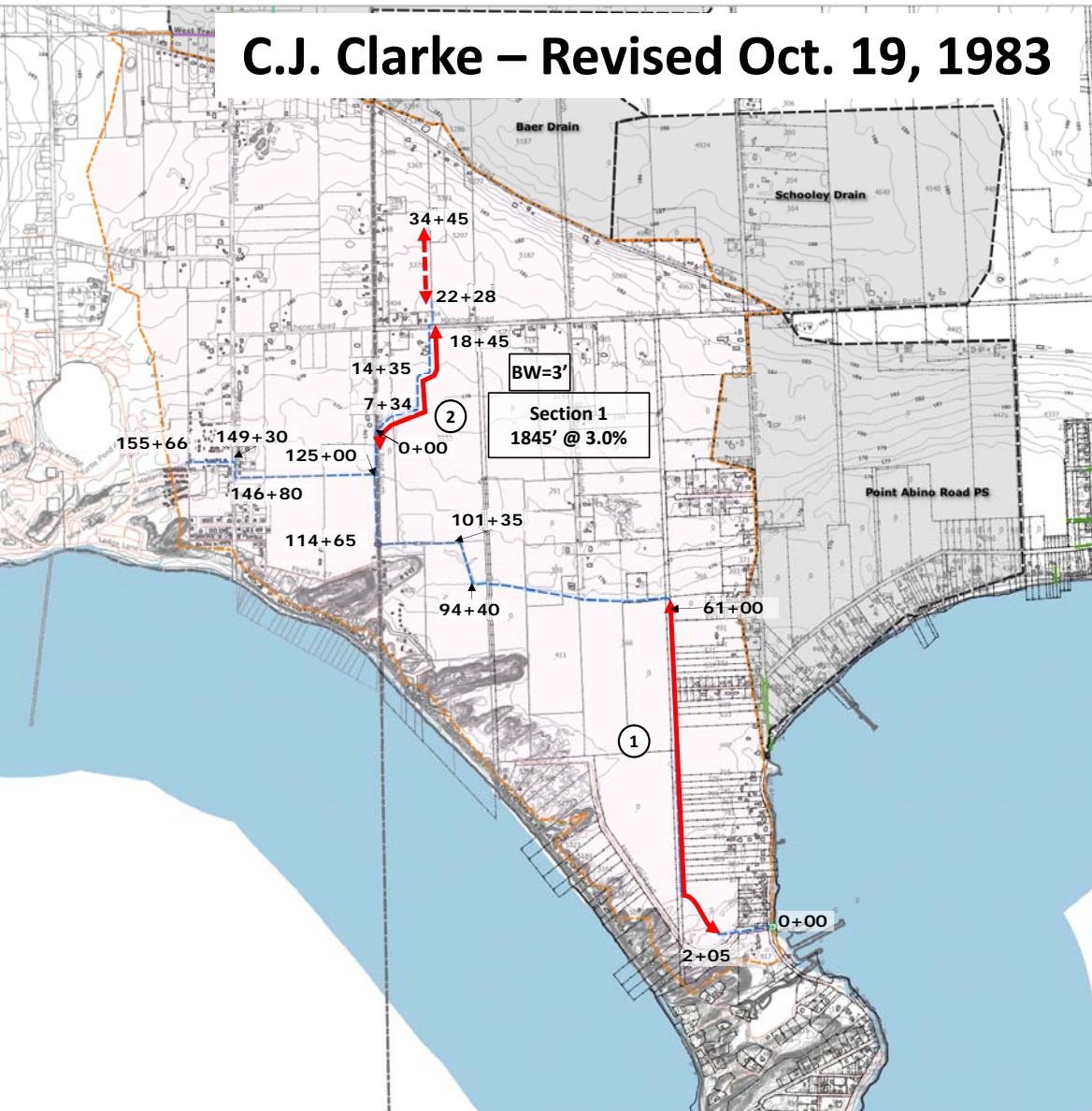


# J.R. Scott - January 15, 1958





# C.J. Clarke – Revised Oct. 19, 1983



The attached Dwg. No. 1 shows that the first part of the drain up to Sta 61+00 will not improve hydraulically by deepening it, but the removal of the shrubs and some of the tree branches will help during the peak run-offs.

The attached Dwg. No. 2 shows that the character of the land is changing from agricultural to suburban - [particularly along Lake Erie and along Point Abino Road] - and much of the property is being developed for summer residential purposes. This, of course, produces a faster run-off and it also will require a higher standard of drainage be provided in the near future. This could be provided by a regular maintenance program including a regular inspection over the entire length of this drain.

## BRANCH NO. 1 [New Branch of the Point Abino Municipal Drain]

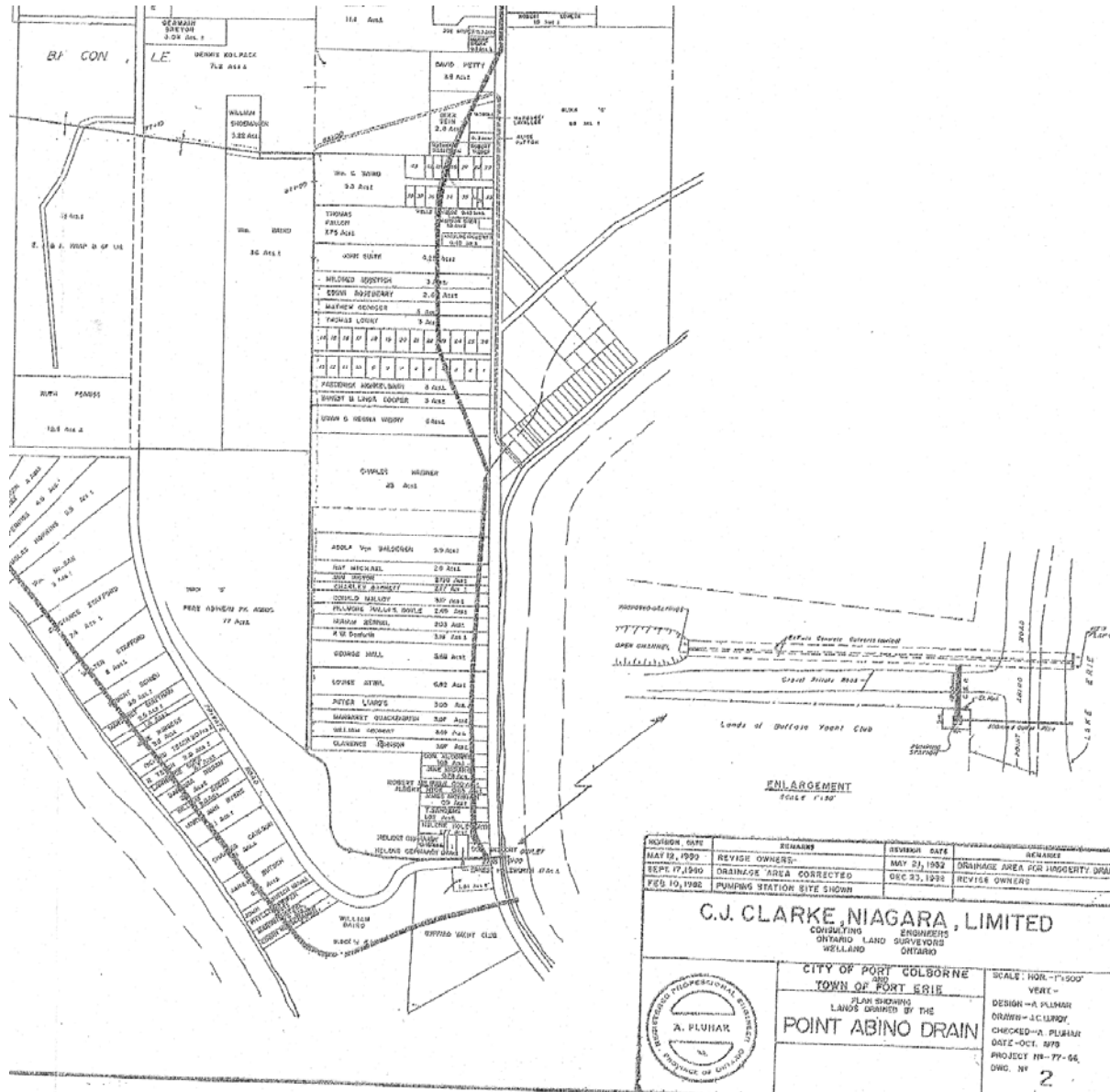
In accordance with your instructions, we have made a re-examination and survey of the ditch which appeared to commence on the property of Mr. Ray Haggerty in Lot 35, Concession 1, L.E. Town of Fort Erie, crosses over Marcy Properties Inc. in Lot 35, B.F. Concession L.E., Town of Fort Erie, runs south on the West side of Holloway Bay Road [Townline Road] as a roadside drainage system and empties into the Point Abino Drain at Sta 125+00.

Bylaw 1420/113/83

Project cost: \$91,650.00

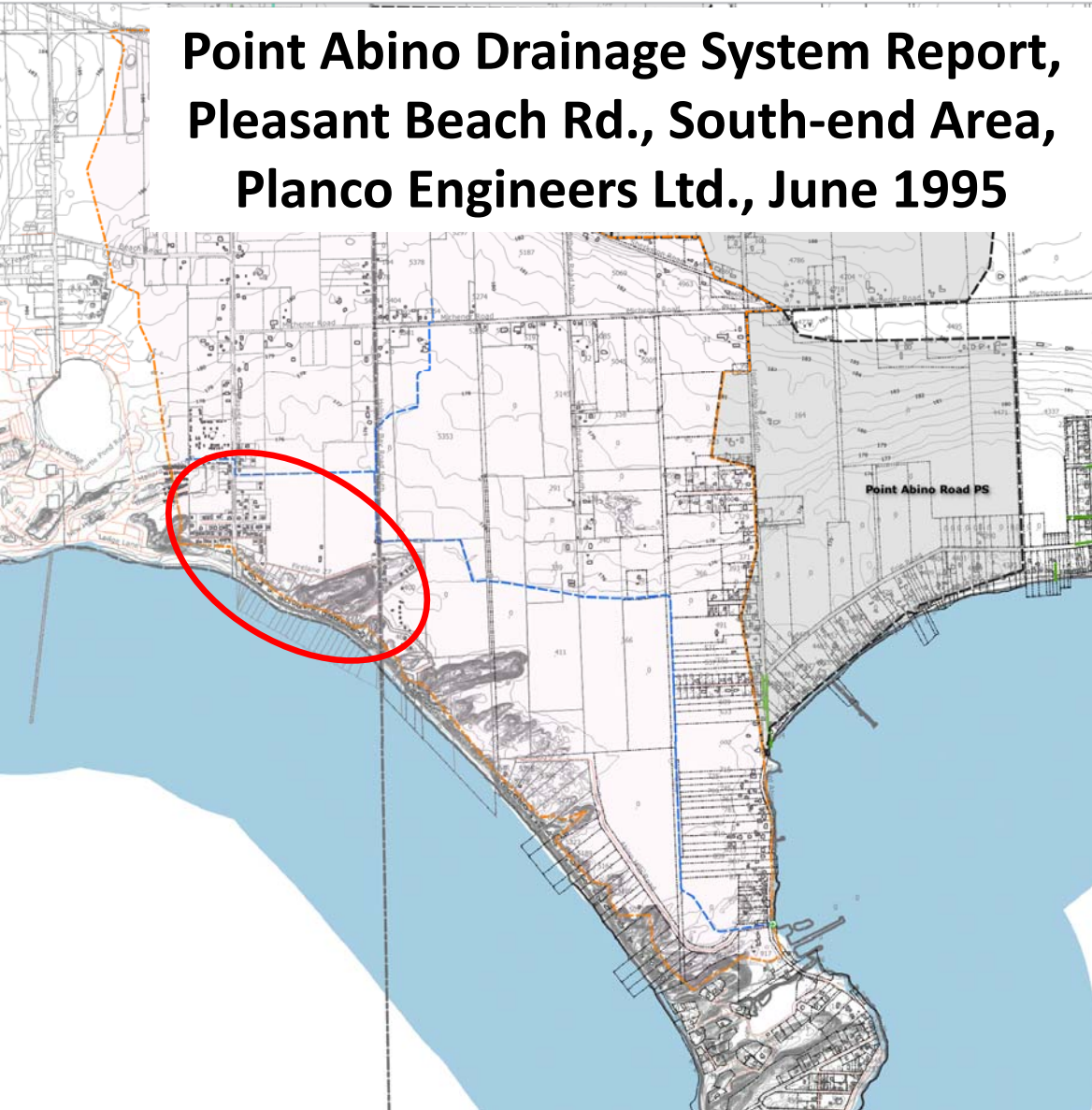
Today's value: \$224,177.52 (inflation adj.)

\* This is the report used by the Tribunal in 1998 to assess costs to the upstream owners for the engineering report prepared but not implemented.





# Point Abino Drainage System Report, Pleasant Beach Rd., South-end Area, Planco Engineers Ltd., June 1995



## Report Summary

The report identifies solutions to the drainage issues within the Point Abino Drain Watershed. Two primary solutions are recommended:

- Providing a new outlet by gravity
- Providing an outlet by pumping station

Pleasant Beach Road Pumping Station Preliminary

Estimate of Cost: 1995 **\$155,000 (CPI adjusted 2021: \$ 247,355.)**

Excluding:

- Property acquisition
- Legal
- Geotechnical
- Environmental requirements

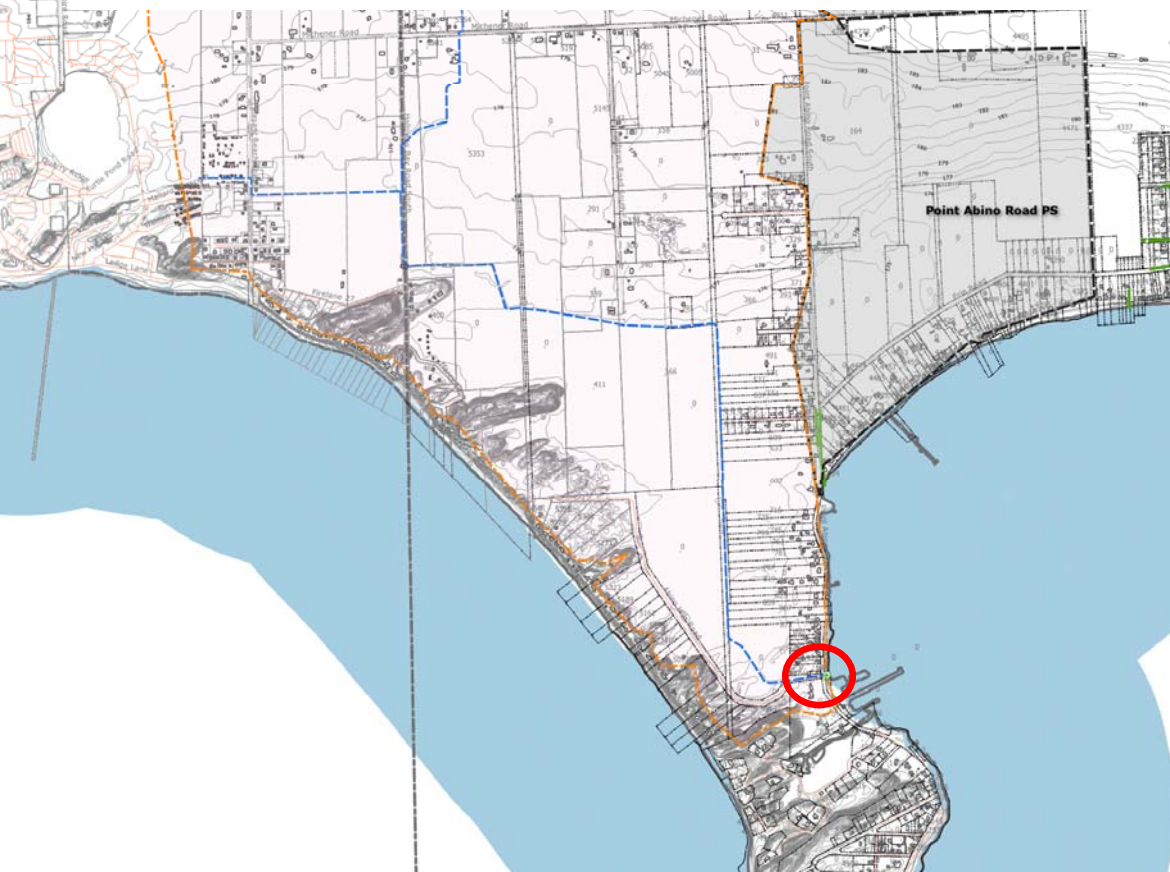
Three Tribunal Hearings; June 18, 23 and August 28, 1987

“It is further ordered that the City of Port Colborne have a Preliminary Report prepared to investigate the advisability of an outlet incorporating a pump at either Pleasant Beach Road or the Holloway Bay Road.

It is finally ordered that the Drainage Engineer be empowered to extend the pump discharge pipe of the Abino Drain offshore into the Bay at his discretion.

No costs awarded.”

# City of Port Colborne, Report on the Point Abino Drainage System Proposed Pumping Station at Point Abino Road, Planco Engineers Ltd., May 1996.



## Report Summary

The report ordered by Tribunal brought by the City of Port Colborne.

Pumping Station Preliminary

Estimate of Cost: 1996 \$190,000 2021 CPI adjusted: \$298,386.36

## Excluding:

- Property acquisition
- Legal
- Geotechnical
- Environmental requirements

HEARING: July 22, 1998

DATE OF DECISION: July 28, 1998

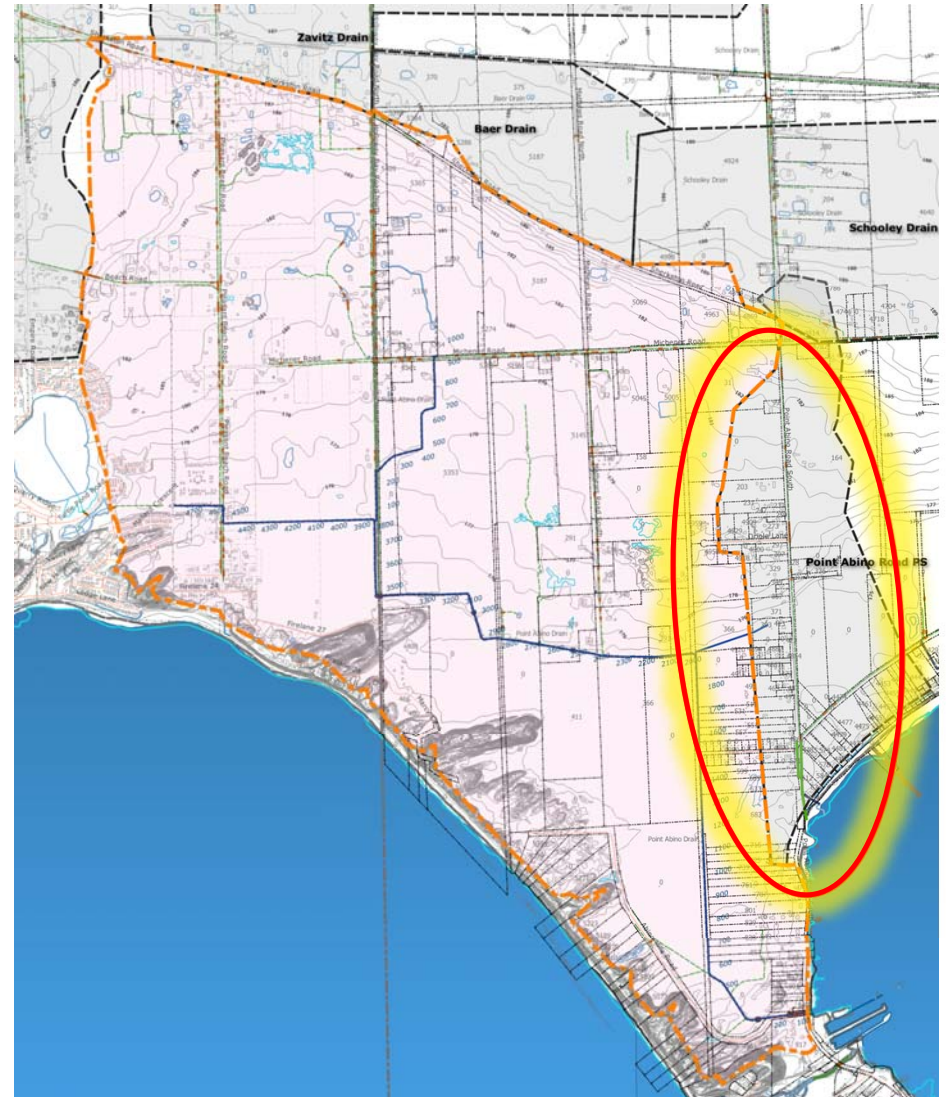
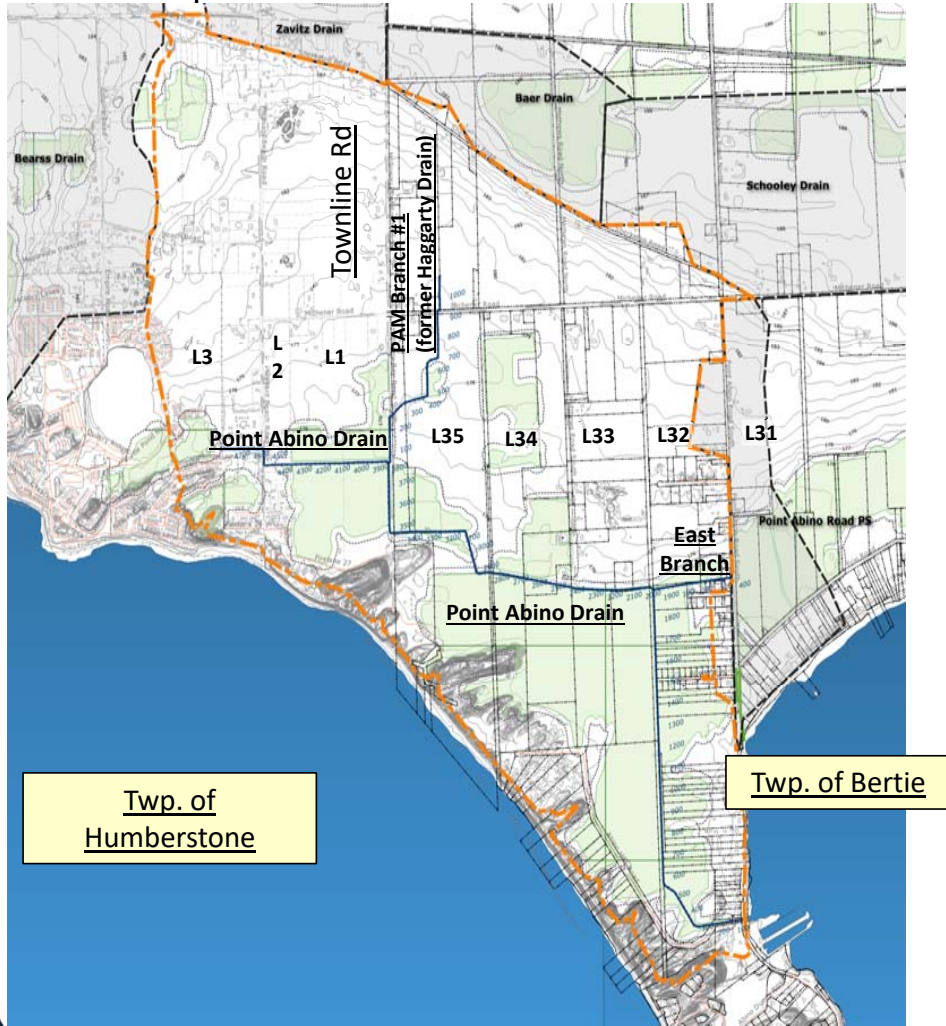
FILE NUMBER: 1998-28

An application to the Ontario Drainage Tribunal by the City of Port Colborne requesting the Tribunal issue an Order **rescinding** the September 15, 1987 order of the Tribunal directing the City of Port Colborne to install a low lift pumping station in the Town of Fort Erie on the Point Abino Drain.



# Point Abino Drain

Historical map references



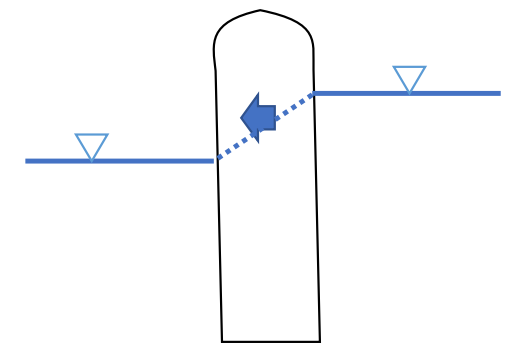
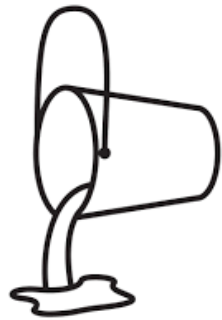
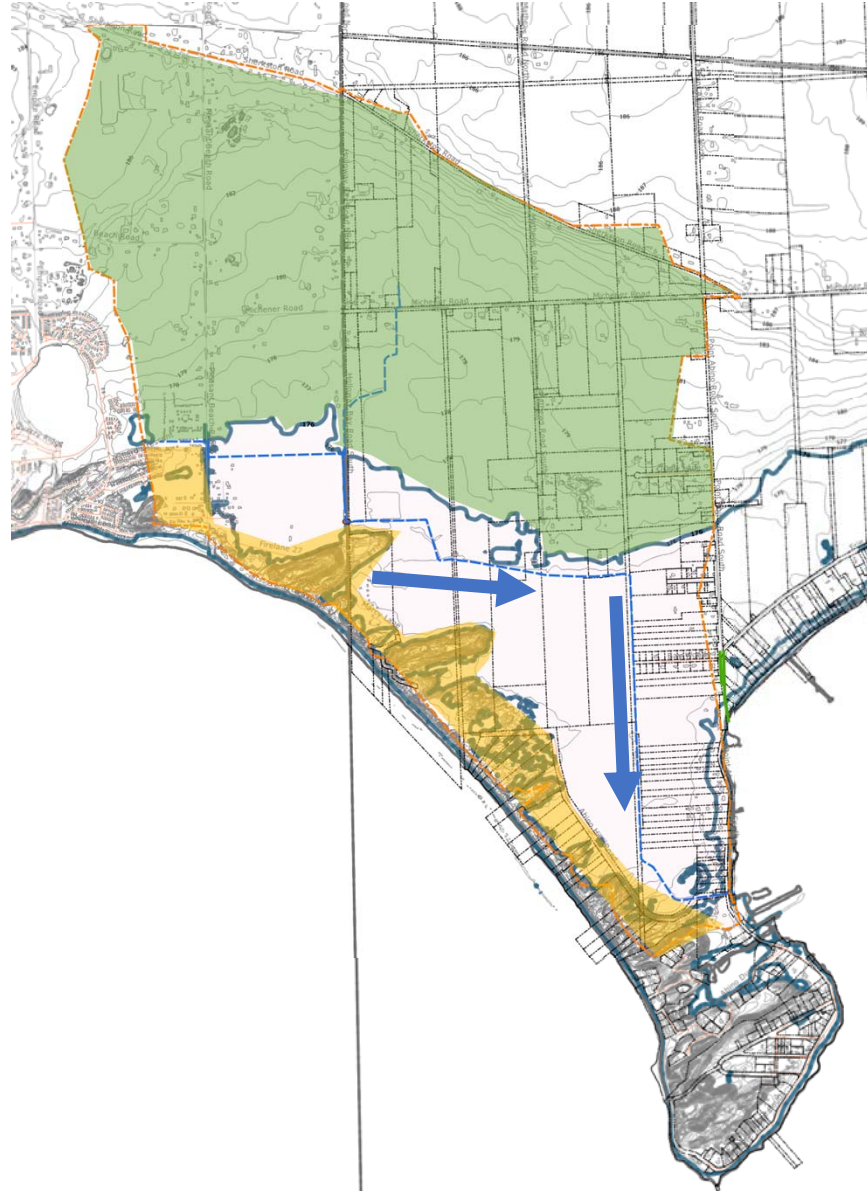
# Baseline Report – Overview

Baseline Report

Baseline Plan & Profile Drawings

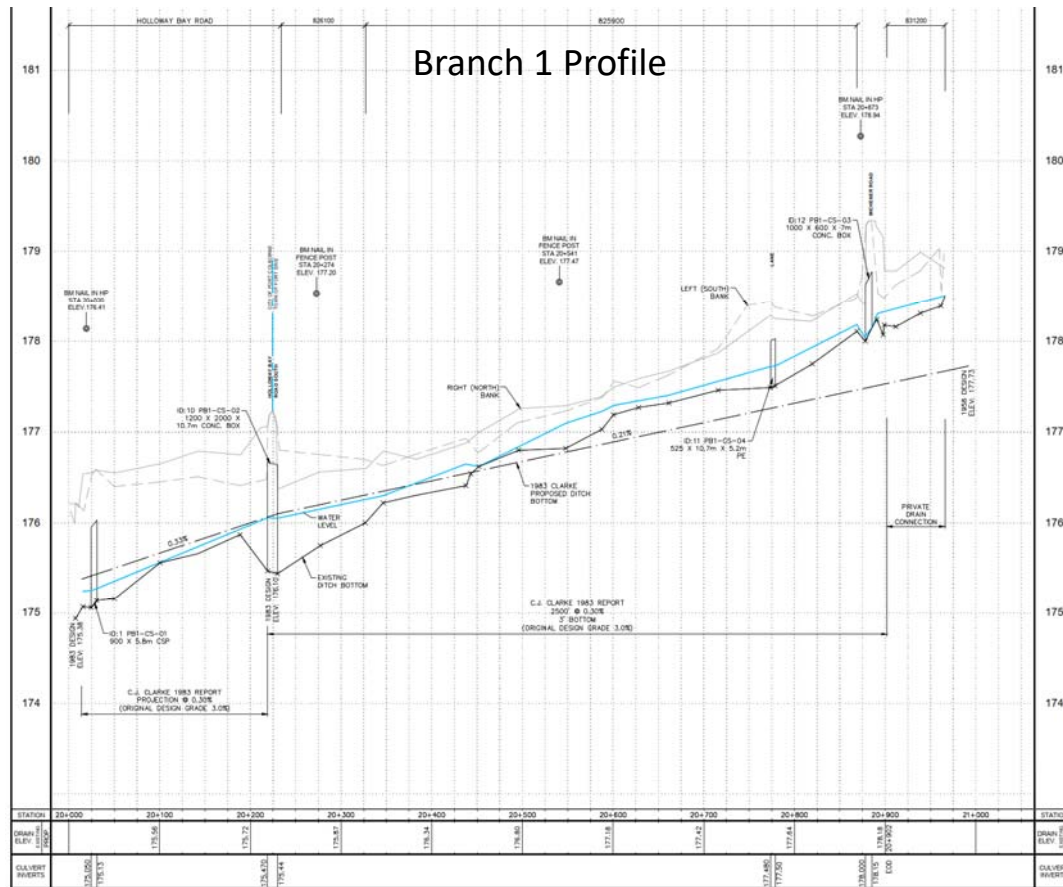
Environmental Conditions





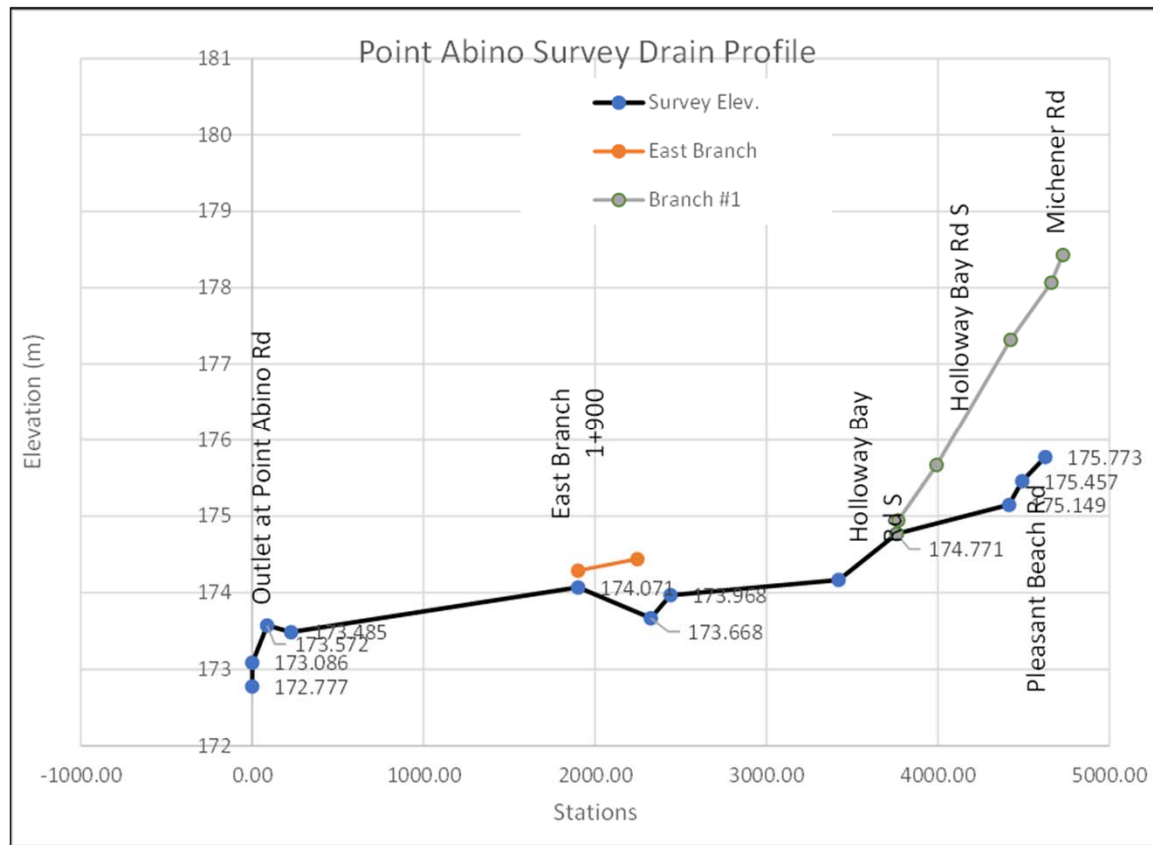
# Baseline Report

Branch 1 Profile



- The Point Abino Drain serves an area of 792 hectares
- Main Drain is 4690m in length
  - Watershed average fall (slope) is given as 0.26% or 2.6m per 1000m
  - Drain average fall (slope) is given as 0.14% or 1.4m per 1000m
- The Point Abino Drain is a split slope watershed,
  - upper portion relatively high slope
  - very low slope in the lower half of the drain.
- Control Gate Sill elevations;
  - North side is 172.796
  - South side is 173.086
  - Lake Bottom is 172.82

# Drain Profile and Branch Drains



# Environment



# Lake Erie Surge - Seiche

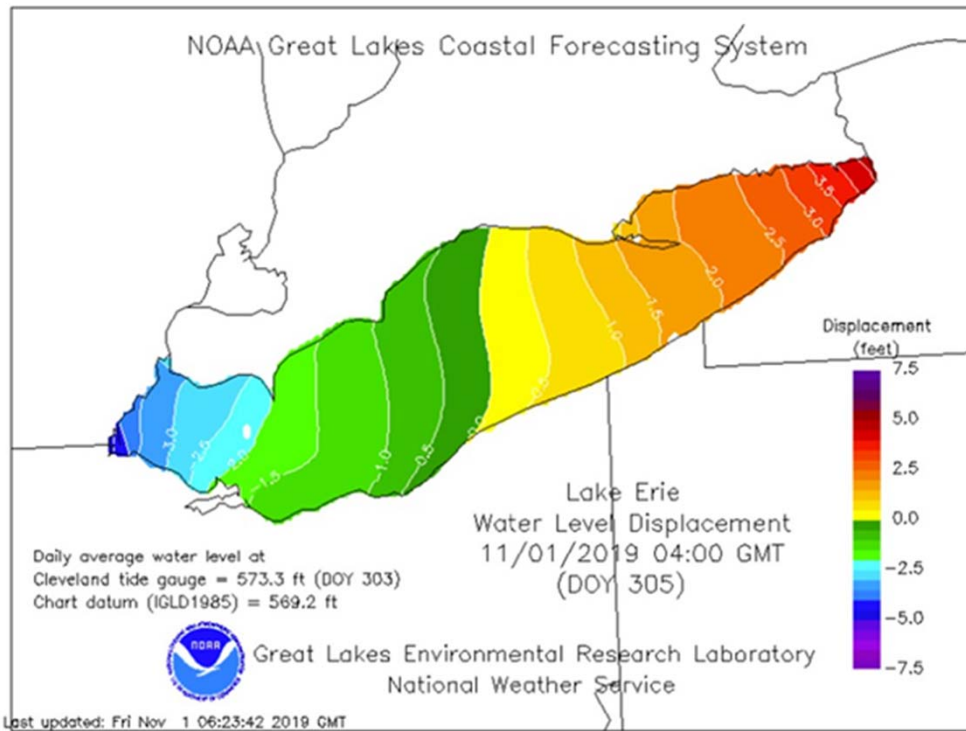
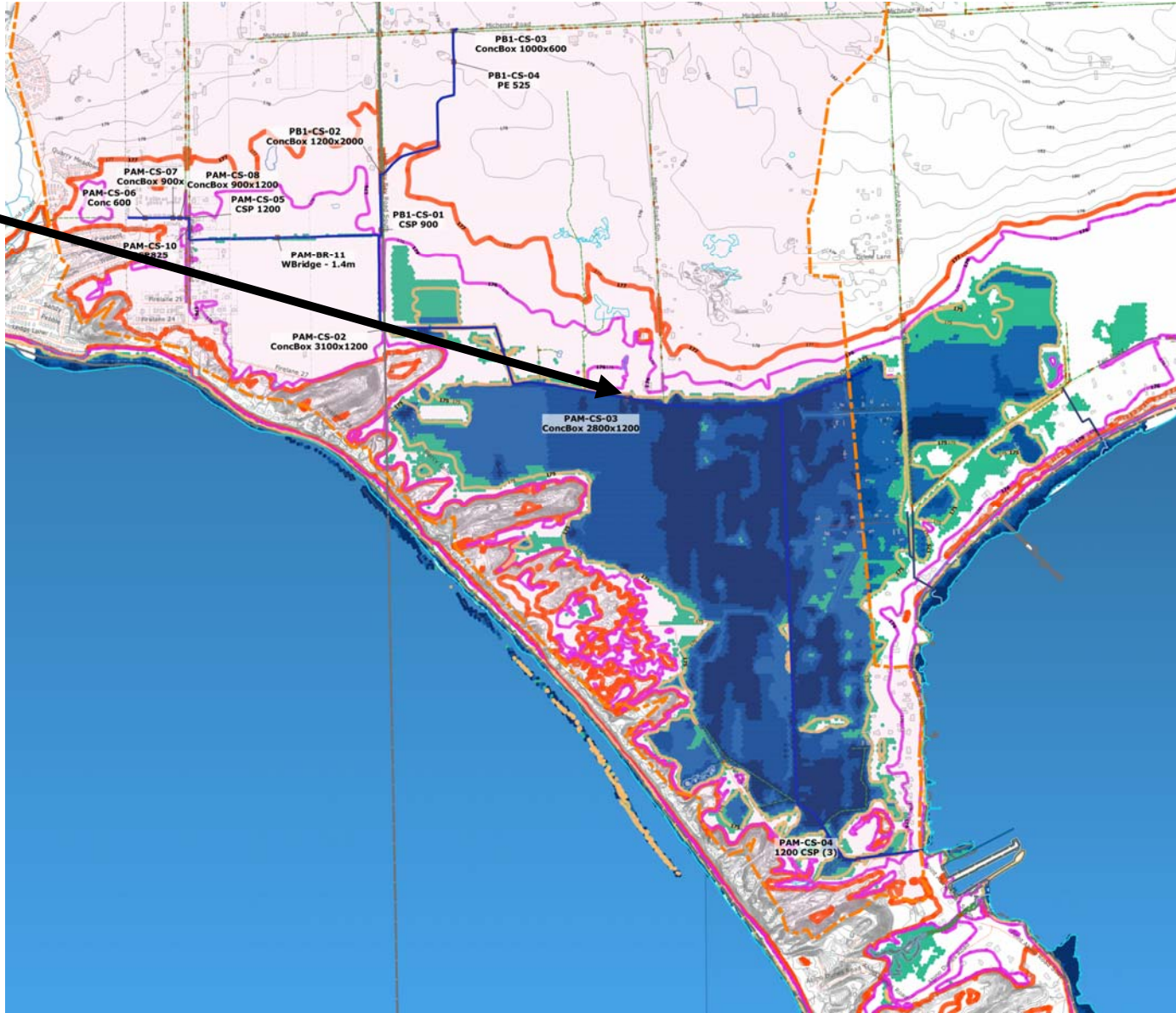
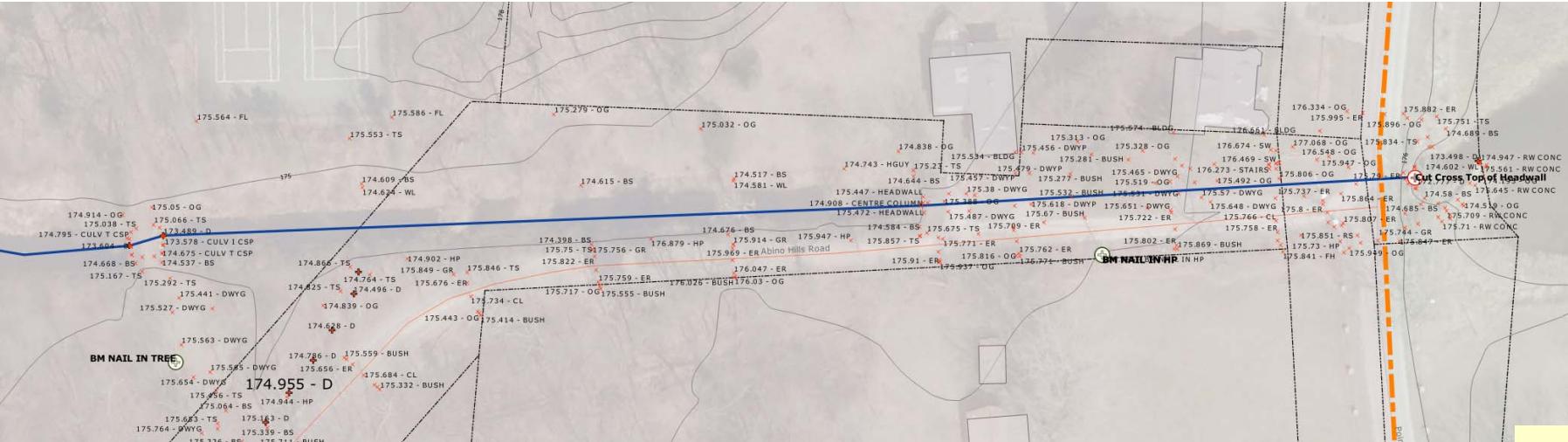
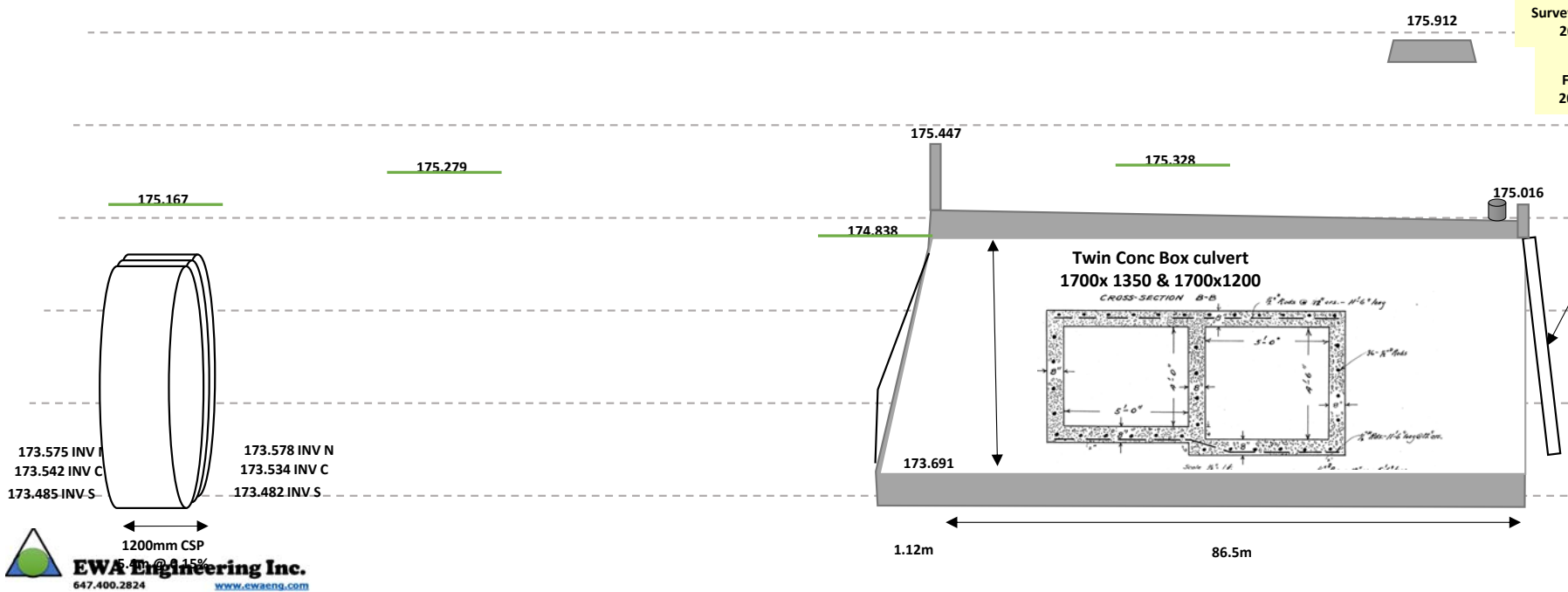


Photo from  
Dec 11, 2020



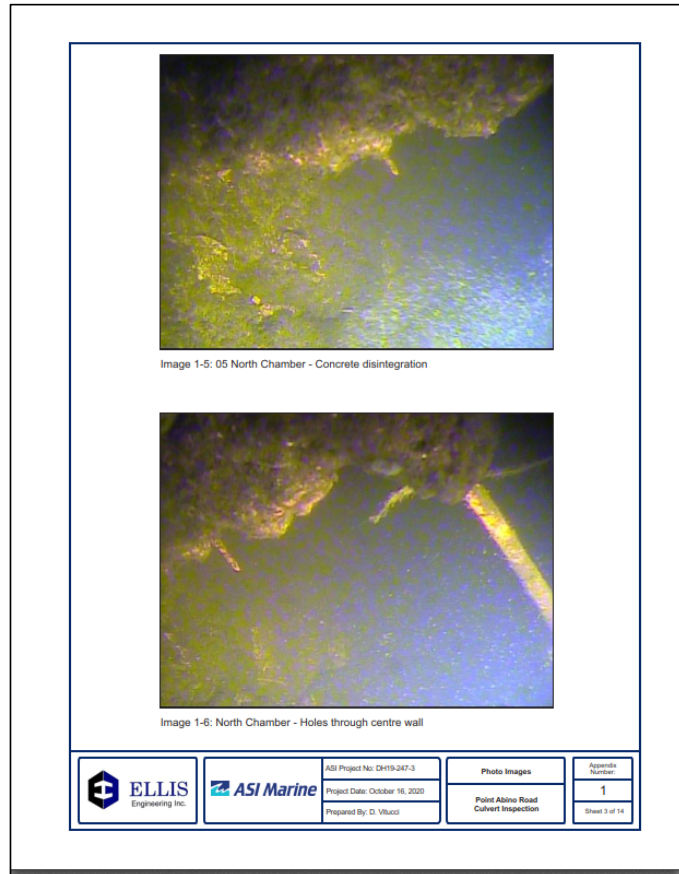


177.0	Obs. Surge / Seiche
176.5	
2.072m rise (6.8ft)	
176.0	176.459 Surveyed Flood Elev. 2020/11/15
	176.449 Flood Elev. 2019/10/31
175.0	Steel Flap Gate
174.95	174.997 High Water Mark 2020 2020 monthly mean
174.0	Average 174.16 IGLD 174.387 Waters Edge 2020/10/07
173.500	173.500 IGLD 85 Datum
173.0	





# 2021 – Outlet Inspection Results



- Retaining Walls on East Side
  - undermining and voids up to 1.2m in depth.
- North Cell
  - Medium to severe scour, scaling.
  - Areas of cracking, spalling and deterioration
  - Voids in sidewalls, north sidewall has large void
  - Multiple holes through centre wall.
  - Cracking around CSP
- South Cell
  - Medium to severe scour, scaling.
  - Spall (.08m high, 0.12m deep with exposed rebar)
- Overall, North Cell is in poor condition and the South Cell is in fair to poor condition.

## Recommendation:

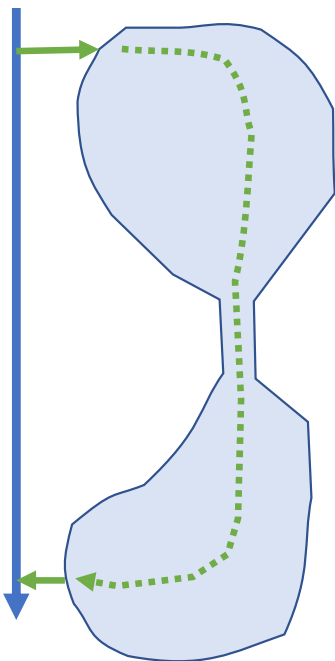
- Replace structure within 1 to 5 years.
- Monitor roadway for settlement and sinkholes until structure is replaced.

# Drain Status – Issues, Problems & Opportunities

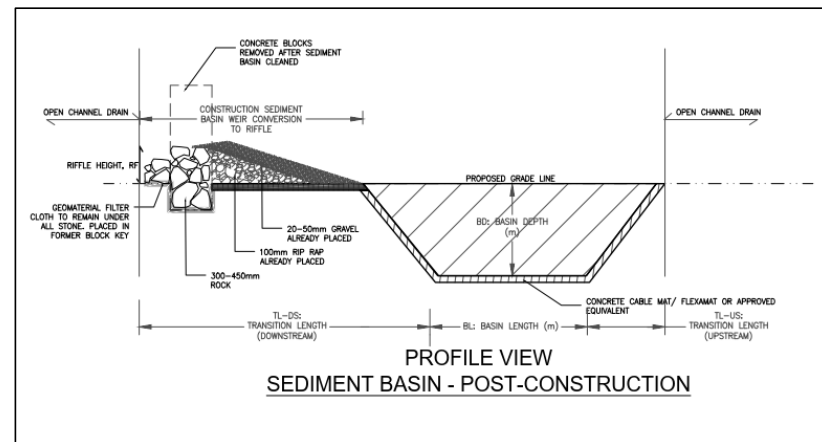
- Challenges with Grade lines and static water in the lower half of the drain.
- Some culverts require repair and/or replacement.
- Outlet to be replaced within 1 to 5 years.
- Existing passive flap gates are working after recent repair.
- Are there specific petition based improvements requested?
  - Pumping Station proposed on the basis of a Petition with preliminary design, cost estimate and assessment schedule.
- Are there opportunities for improvement?
  - Increase flood flow capacity, pool & riffle design.
  - Berm options? East side of North/South portion along backside properties on Point Abino Road.

# Drain Water Quality Improvements

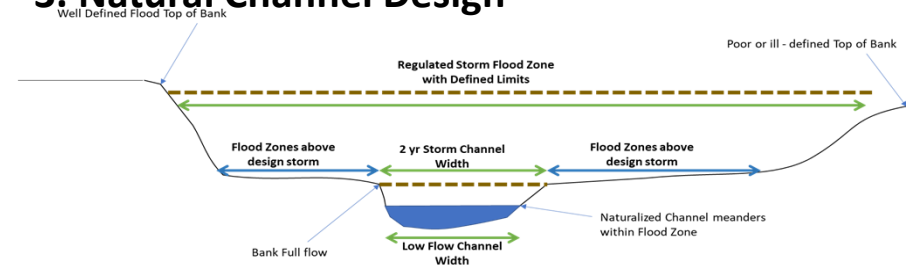
## 1. Possible Wetland or Pond implementation



## 2. Sediment Basins



## 3. Natural Channel Design





# Drain Control Structure

- Control Structure Considerations:
  - Pumping Report in 1997, 25 years
- Control Structure Gate flow capacity
  - Runoff flow through openings 1:100 year storm
  - Storm surge level control
- Addition of flow level monitors
- Flotsam, trash rack
- Functional improvements
  - Less weight to open
  - Improved seal to face of culvert



# Gate Flow vs. Pumping



- Pumping Station - based on standard accepted rates
  - 7mm per 24 hours of volume pumped.
- Point Abino watershed of 752Ha
- Requires a pump operating at
  - 582.1 lps (9,000 USGPM)
  - to 1164.2 lps (18,000 USGPM)
- Beaver Dam Drain is 750 lps (12,000 USGPM)
  - 750mm (30") D suction pipe (vertical) and 600mm (24") D discharge pipe
  - 3.2m x 8m wet well with trash rack

# Point Abino Watershed Report

Computer Based Hydrologic and Hydraulic Analysis

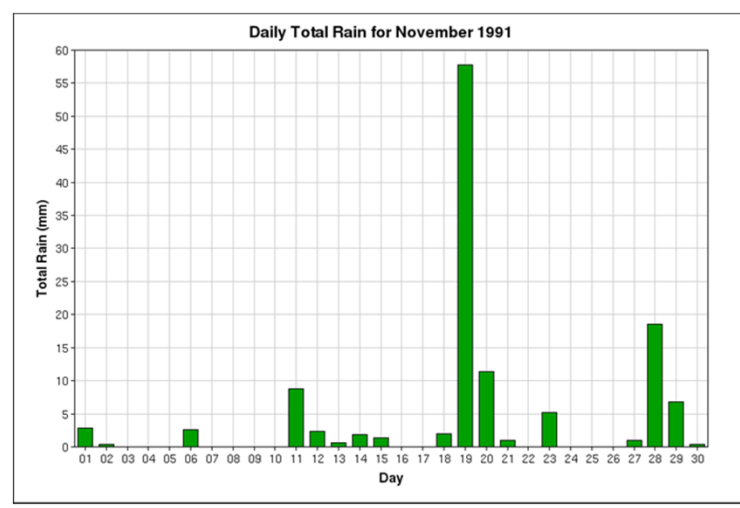




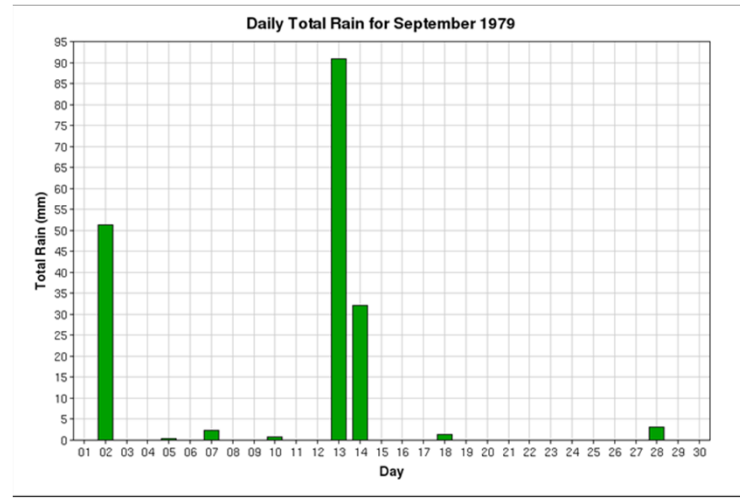
# Some Storms

Year 1991 had a value greater than the 100 year storm. Data 64.2mm  
100 year = 63.1 - 2 hour storm comparable event

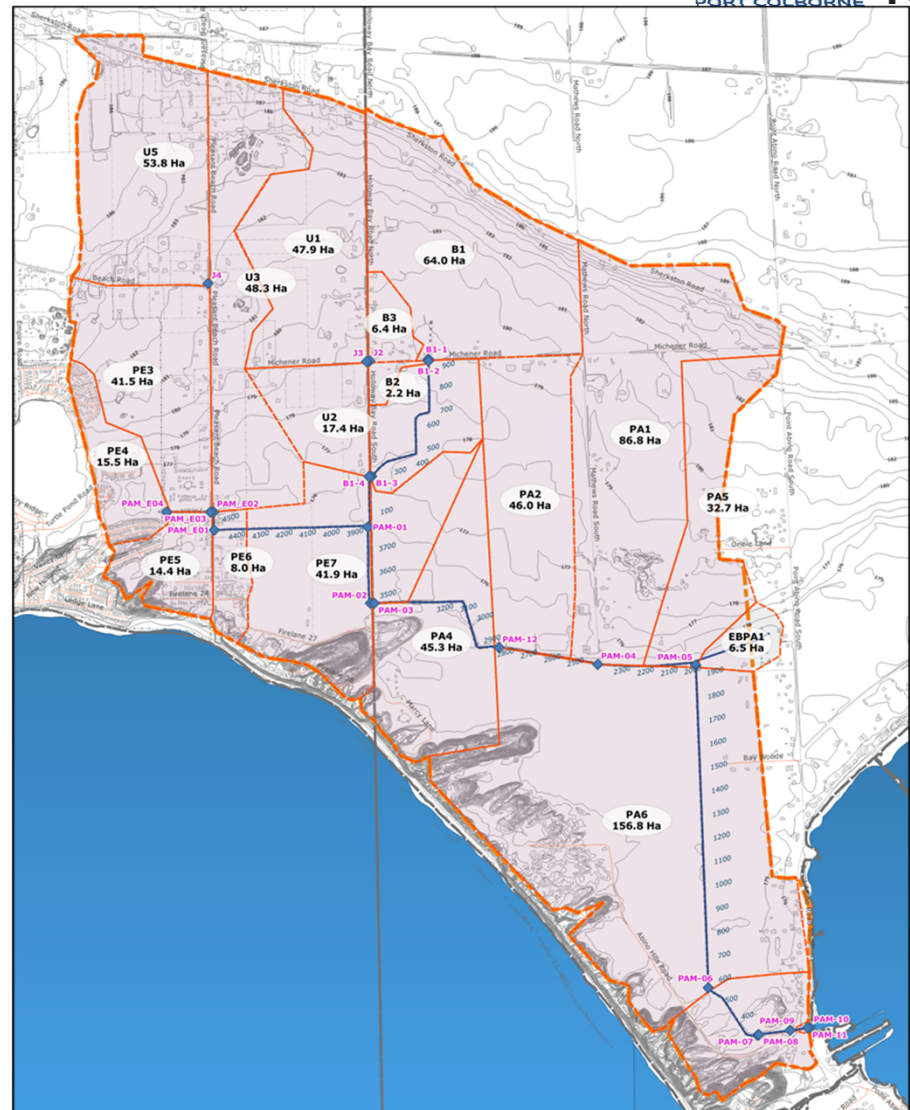
Design Storm	Probability return period	Volume, mm
SCS Type – 24 hour	1:2	49.8
	<b>1:5</b>	<b>68.9</b>
	1:10	81.5
	1:25	97.5
	1:50	109.3
	1:100	121.1



Year 1979 had a value greater than the 100 year storm. Data 116.4mm  
100 year = 105.9 - 12 hour storm comparable value

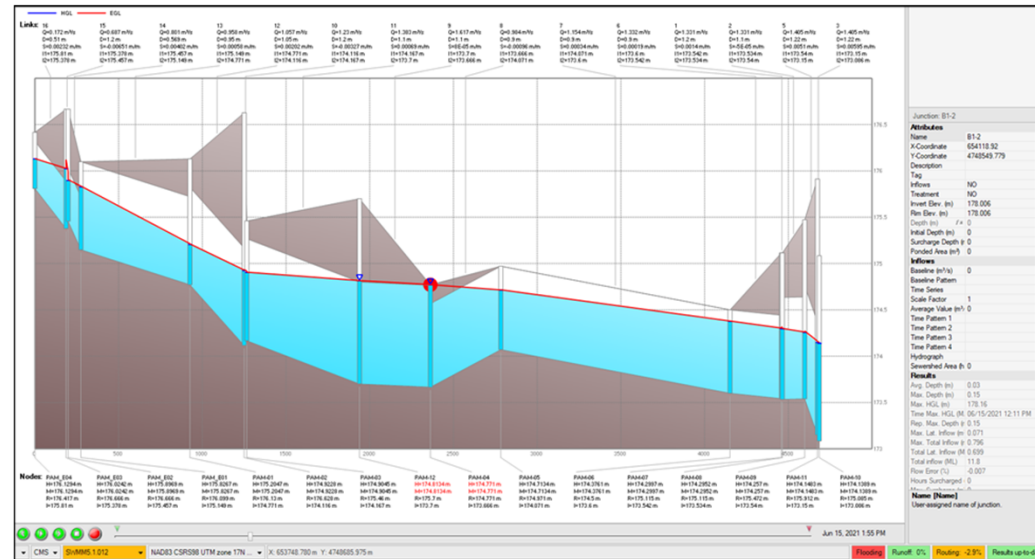


# Watershed Analysis



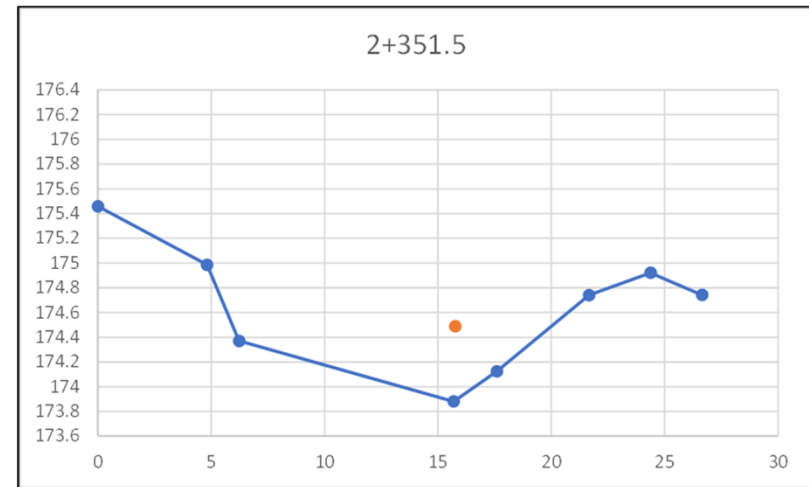
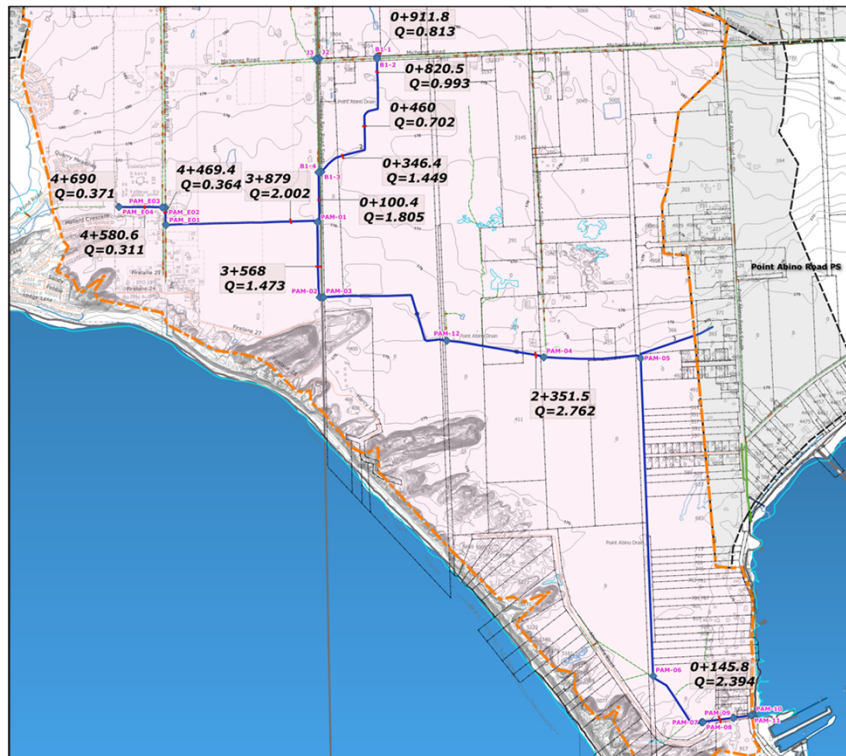
# Hydrologic and Hydraulic Model results

- ½ the upper portion of the drain has a positive slope and works to design.
- The lower ½ is compromised by a lack of slope to achieve flow to the outlet, when the outlet is open.
- The entire lower reach is heavily influenced by the lake elevation.

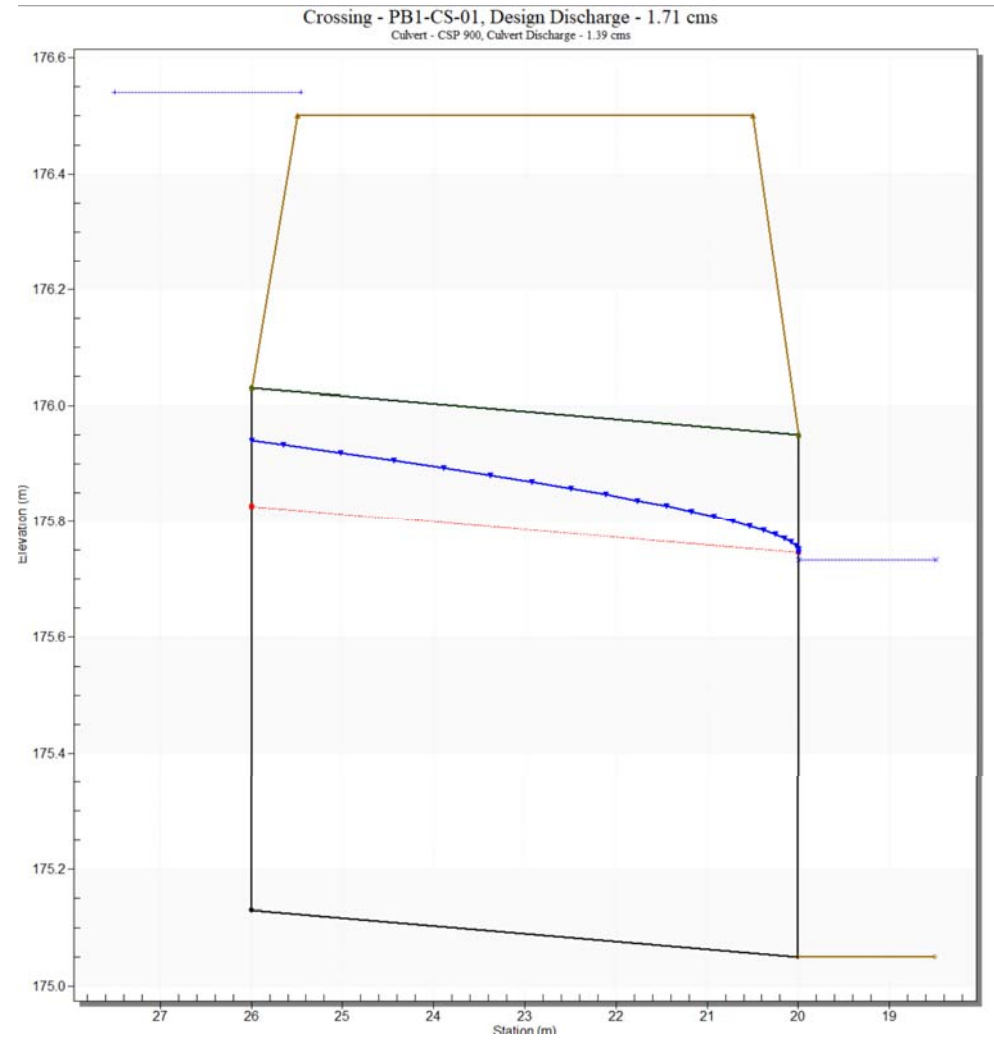
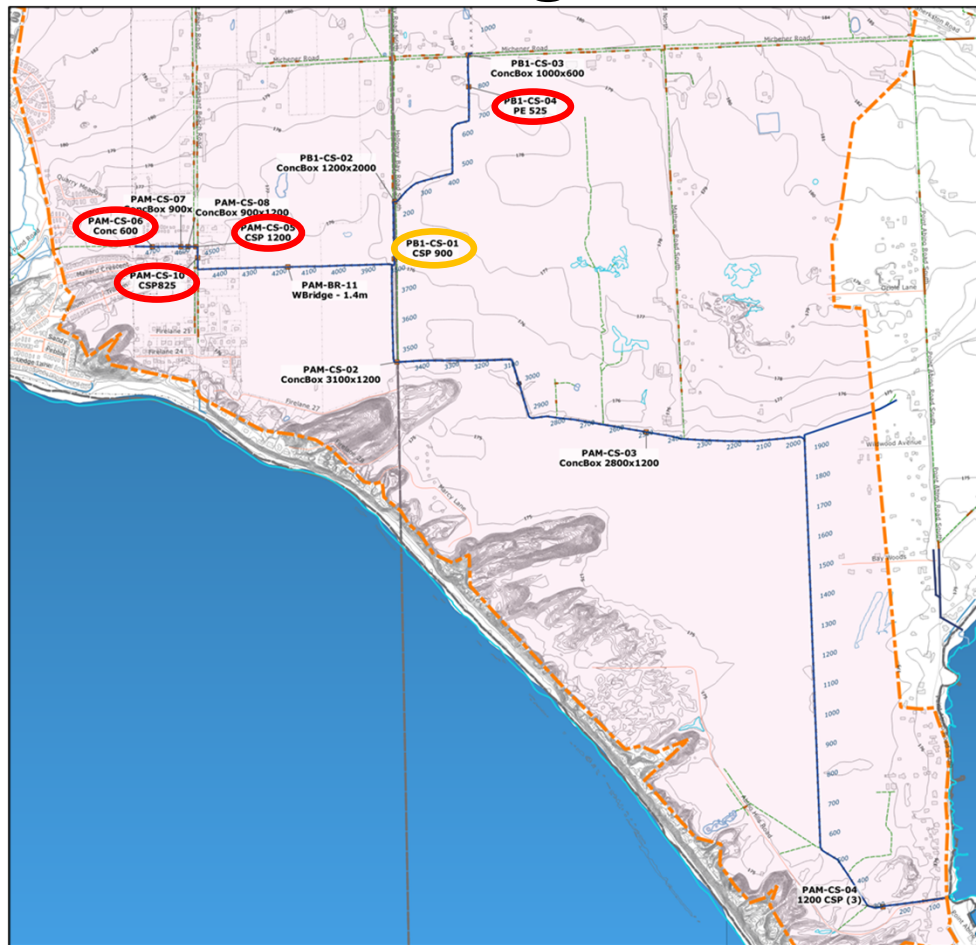




# Survey Cross-Section Capacity Analysis

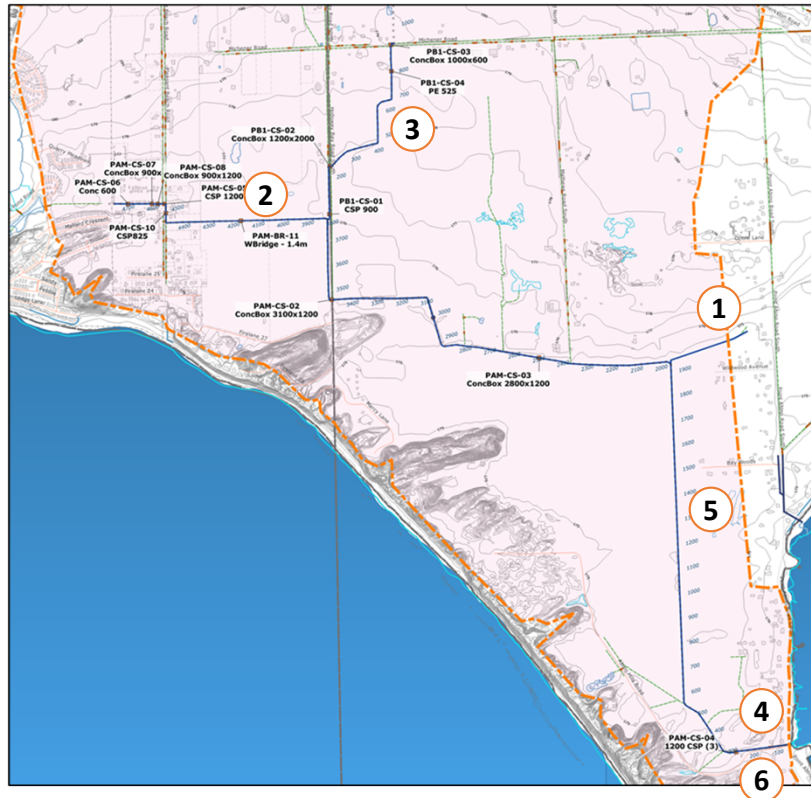


# Drain Crossings



# Improvement Opportunities

# Point Abino Design Issues



1. Abandon East Branch stub?
2. Main - Design Grade review above STA 3+450 and culvert improvement
3. Branch #1 – Design Grade review and culvert improvement
4. Point Abino Rd Culvert Replacement,
  1. Increase capacity for gravity flow.
5. Increase flood capacity volumes in lower reach
6. Increase outlet capacity through pumping.



# Point Abino Road Culvert Replacement

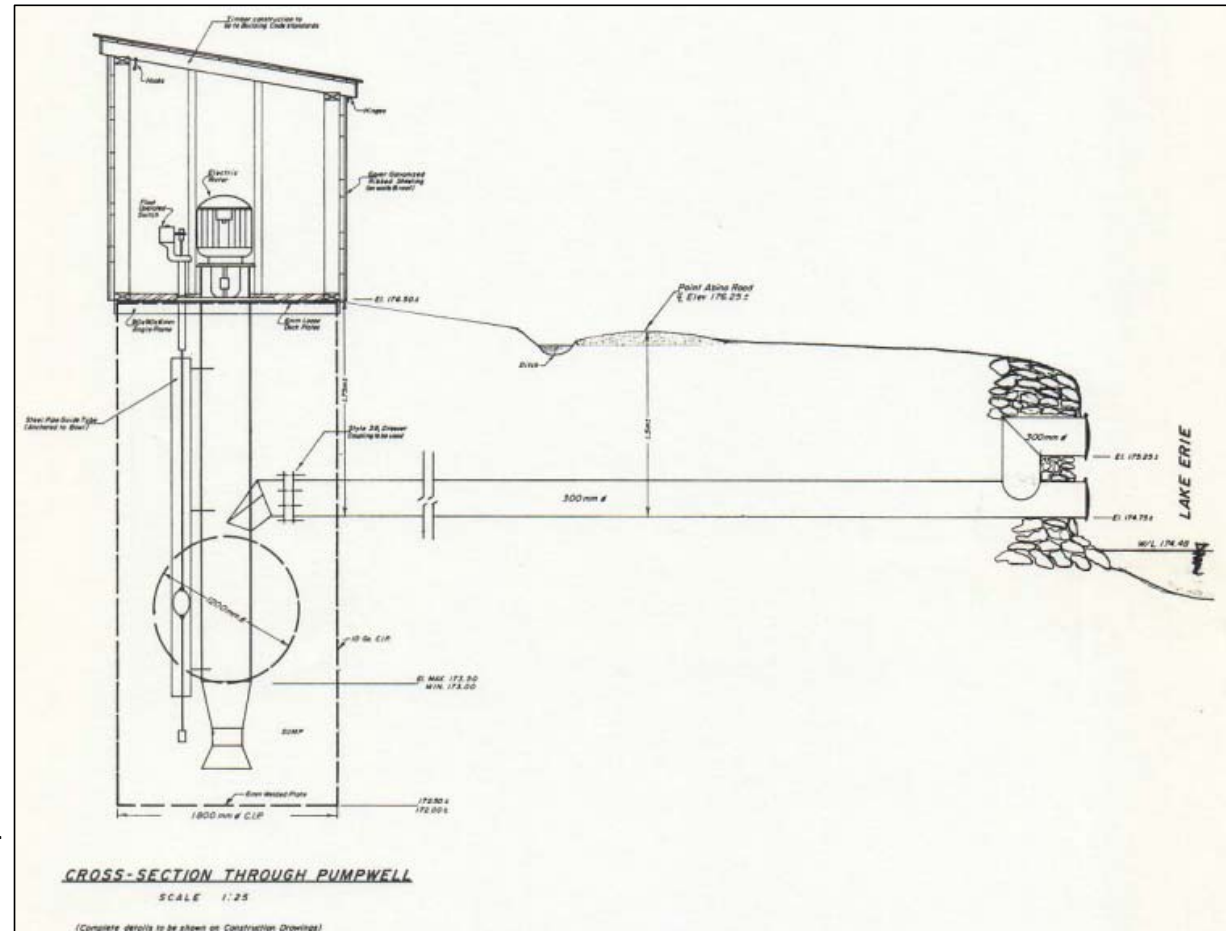


- Existing lengths
  - 9.0m – Shoreline & Roadway
  - 14.8m – Road allowance?
  - 62.9m – Private Land access
- Inspection Capital Replacement Cost = \$2,000,000.
  - 23.8m = \$550,000.
  - 62.9m = \$1,450,000.
- Two private access culverts
  - \$200,000 each Total \$400,000

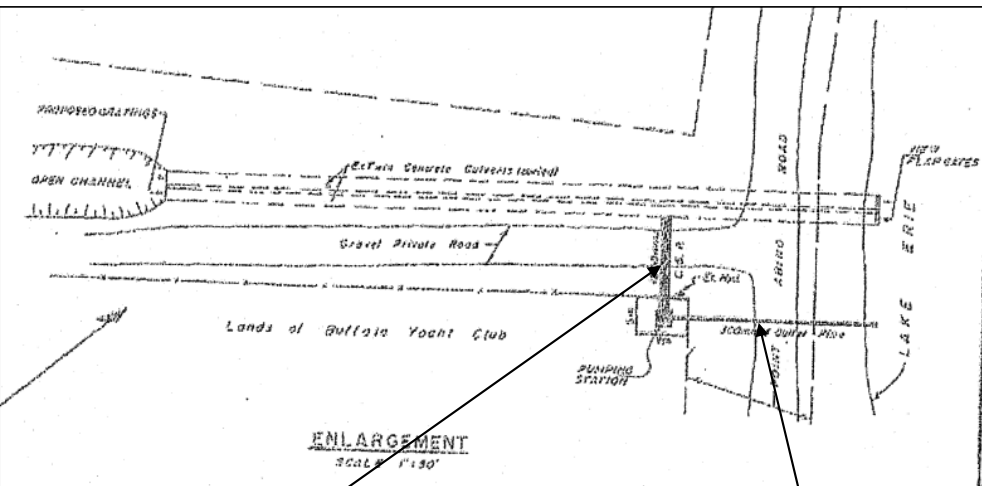
# Drain Pumping Station

## Pumping Considerations:

1. Pumping Pre-liminary Report;
  1. Preliminary Design Scope
  2. Cost Estimate
  3. Assessment schedule
2. Addition of drain level monitoring
3. Stationary Motor to power pump
  1. Electrical
  2. Site back up power?
    1. Diesel power genset, or
    2. Gas power genset
4. Site options and impacts
  1. Location relative to future culvert structures.
  2. Submersible Pump option, or other options



# Pumping Station Site Layout Options






1200mm D Intake pipe

300mm D Intake pipe



# Pumping Station Petition 4 request

- Rough Estimate: \$ 450,000 
- Property benefit if less than 176.5m elevation.
  - Pay portion of cost, (30% to 100%)
- Property liability outlet within entire watershed.
  - Pay portion of remaining cost.
- Petition Drains
  - (a) majority of owners (>50%) 
  - (b) more than 60% of the land area 
  - (c) required for a road, request by jurisdiction responsible for road
  - (d) drainage required for agricultural purposes, the Director



# Next Steps

- Design Details – Review with approval Agencies for comment
- Engineer's Report:
  - Draft Final Report Point Abino Drain
  - Resolution of Petition 4 requests (if any)
- Public Information Centre #2:
  - Design, Cost Estimate and Assessments
- Report Adoption by Council – Provisional
  - 40 day period for appeals
- By-law is passed – tendering and construction to proceed

# Thank you

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